

What is claimed is:

1. A process for producing a heat-resistant intermetallic compound Ni₃Al foil having a room-temperature ductility, which comprises a first step of arc-melting an alloy having a chemical composition containing Ni as a main component and Al to form a starting rod, a second step of growing the starting rod in columnar crystal form by unidirectional solidification to form a unidirectionally solidified rod, a third step of cutting out the unidirectionally solidified rod to form a plate, and a fourth step of cold-rolling the plate at room temperature to form a foil.
2. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in claim 1, wherein the alloy in the first step contains Al in an amount of at least 12.8% by weight and at most 13.6% by weight and has an L1₂-type ordered structure.
3. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in claim 2, wherein the alloy in the first step contains a third element other than Al and has an L1₂-type ordered structure.
4. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in any one of claims 1 to 3, wherein in

the first step, a rod having a diameter of 50 mm or less is formed as the starting rod.

5. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in any one of claims 1 to 4, wherein the rate of unidirectional solidification in the second step is 25 mm/h or less.

6. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in any one of claims 1 to 5, wherein in the third step, the thickness of the plate is 5 mm or less.

7. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in any one of claims 1 to 6, wherein in the cold-rolling of the plate in the fourth step, annealing is conducted at a temperature of 800°C (or 1,073 K) or more for 20 minutes or more.

8. The process for producing the heat-resistant intermetallic compound Ni₃Al foil having the room-temperature ductility as claimed in any one of claims 1 to 7, wherein after the fourth step, the work-hardened, cold-rolled foil is annealed with a degree of vacuum of higher than 10⁻³ Pa at a temperature of 800°C (or 1,073 K) or more for 20 minutes or more, and further cold-rolled to form a foil.

9. A heat-resistant intermetallic compound Ni₃Al foil

having a room-temperature ductility which foil has a chemical composition containing Ni as a main component and Al in an amount of at least 12.8% by weight and at most 13.6% by weight, and has a thickness of 200 microns or less.